polk audio
The Speaker Specialists ®

TRUE STEREO
Stereo/Dimensional Array Signature Reference System

Instruction Manual

SDA 1C, SDA 2B, CRS + (Compact Reference System)

Important: Please read the instructions thoroughly before attempting to use your SDA Loudspeakers

INSPECTING FOR SHIPPING DAMAGE:
When you unpack your SDA loudspeakers, inspect both cartons for shipping damage. Each unit leaves our plant after thorough inspection and in perfect condition. Therefore, any visible or concealed damage must of necessity have occurred in handling after it left the plant. If there appears to be damage to your speakers, contact your Polk Audio dealer immediately.

CARE AND CLEANING OF YOUR SDA LOUDSPEAKER
As with any piece of fine furniture, the finish of your SDA loudspeaker will maintain its appearance with reasonable care. Natural wood trim can be restored to its original luster by applying a light coating of furniture oil such as lemon oil, and buffing away the excess. If water is accidentally spilled on any finished wood surface, it should be wiped off immediately.

Vinyl surfaces can be cleaned by wiping with a sponge or a cloth dampened with water. Household cleaning solvents should NOT be used as they may damage the vinyl.

The grilles may be cleaned by brushing gently or vacuuming.

SET-UP INSTRUCTIONS:
1. Each SDA 1C weighs about 85 lbs, the SDA 2B about 80 lbs, and the SDA-CRS+ about 35 lbs. It is highly advisable to have another person help move the larger speakers and position them properly in the room.

2. Note the method in which they are packed and save the packaging. To prevent damage, your Polk speakers should be moved or shipped in their original cartons. Replacement cartons are expensive; do not throw them away. There should be an interconnect cable packed with the right speaker.

3. Now, check the rear of each cabinet. You should have one left and one right speaker. IT IS IMPERATIVE THAT CURRENT VERSIONS OF THE SDA'S NEVER BE CONNECTED TO PREVIOUS VERSIONS OF THE SAME MODEL. TO DO SO RISKS DAMAGE TO BOTH THE SPEAKERS AND TO THE AMPLIFIER. For example, never pair an SDA 1C with an SDA 1, 1A, or 1B, and never pair an SDA 2B with an SDA 2 or 2A. These speakers are readily distinguishable from each other by their appearance and different connectors. If you think you may have two different models, please check with your dealer or call Polk Audio.

4. Start by placing the two speaker cabinets 4 to 6 feet apart with the left cabinet on the left as you face the front of the speakers, at a shorter distance apart (inside edge to inside edge) than you will be sitting from the speakers (defined as the distance from your head to a line drawn across the front of each speaker). This will result in the most dramatic three dimensional imaging, detail and focus.

5. Locate the interconnect cable packed with the right channel speaker. Walk around to the back of either speaker and locate the interconnect socket on the rear of the cabinet. (see Fig. 1). Align the plug properly with the socket and push it gently but firmly into place until it is fully seated against the socket. To remove the plug, grasp it by the molded body (not by the insulated cord) and pull gently outward.

6. Walk across to the other speaker and connect the other end of the interconnect cable in the same manner as described in step 5.

7. Now you are ready to connect the amplifier to the speakers. But first, there is one word of caution:

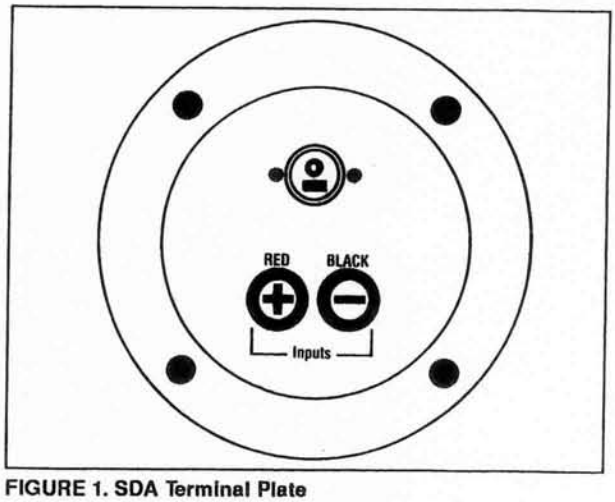

FIGURE 1. SDA Terminal Plate

WARNING-THE SDAS MUST BE USED WITH EITHER COMMON-GROUND AMPLIFIERS OR WITH THE AI-1 AMPLIFIER INTERFACE AVAILABLE FROM YOUR POLK DEALER. FAILURE TO OBSERVE THIS RULE MAY RESULT IN DAMAGE TO THE AMPLIFIER OR TO YOUR SPEAKERS. Now that this has been said you will want to know if your amplifier is common-ground or not. All major brands of receivers are common-grounded and virtually all integrated and separate receivers are common-grounded. Very few amplifiers are not common-grounded and are usually marked with some warning near the output terminals. If you have doubts, call your local hi-fi store or call Polk Audio directly. If your amplifier is of the non-common-ground type, you must use the AI-1 Amplifier Interface with your SDA speakers.

8. Locate the amplifier outputs. They will be marked red and black. Red corresponds to + (plus) and black corresponds to - (minus). Using whatever speaker cable you have (see the section on 'Speaker Hookup Wire'), connect the left channel amplifier outputs to the left speaker, making certain to connect the red or + (plus) output to the red terminal on the speaker. Connect the black or - (minus) amplifier output to the black terminal on the speaker. Using another length of speaker cable, connect the right channel amplifier outputs to the right speaker in the same way. BOTH SPEAKERS MUST BE CONNECTED IN CORRECT ABSOLUTE PHASE FOR PROPER OPERATION. (i.e. red (+) to red (+) speaker to amplifer connections etc). See Fig. 2 to check your connections.

9. Now you are nearly ready to listen. However, in order to work properly the speaker cabinets must be positioned correctly. The speakers must face straight forward and be exactly the same distance from the wall (or flat against the wall). Do not angle the speakers inward or outward. See Fig. 3 for typical set-up and read the section on Room Placement for further experimentation.

NOTE: Fuller and more dramatic bass response will be achieved with the speaker rear wall.

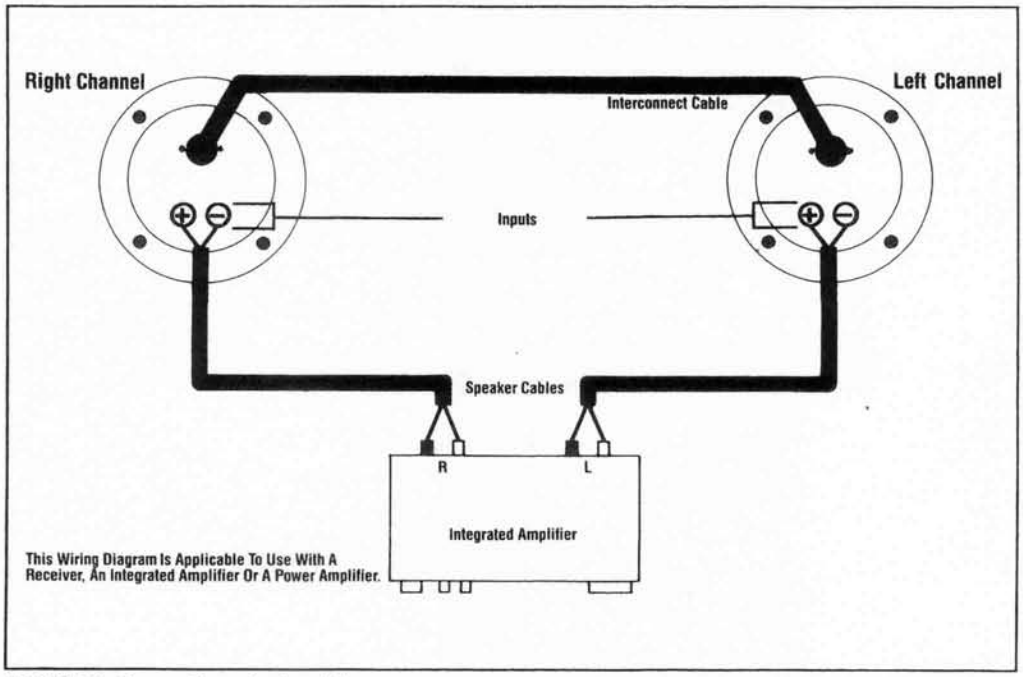

FIGURE 2. Connections to Amplifier

SYSTEM CHECK-OUT:

1. Start with the speakers placed at LEAST 4 ft. apart, facing straightforward and EXACTLY the same distance from the rear of the speaker to the wall.

2. Place a chair in the listening area centered between the speakers,as shown in Fig. 3. The chair should be exactly the same distance from both speakers and, for best results, the distance from the chair to either speaker should be greater than or equal to the distance between the two speakers. Use a tape measure for the purpose of this check-out procedure to verify that the chair is precisely in the correct position.

3. To check for Absolute Phase, disconnect the (-)Black wires from your loudspeaker, leaving the (+)Red wires connected. Switch your amplifier to MONO operation or play some MONO source music. Rotate the balance control back and forth until you find the lowest sound level. If this occurs near the 12 o'clock position, your speakers are in correct Absolute Phase and everything is fine. If there is no sound at all, both speakers are out of Absolute Phase and you will need to reverse the connections at either the speakers or the amplifier so

that red (+) on the speaker corresponds to red(+) on the amplifer etc. If the lowest sound level is heard with the balance control fully to the left, the right speaker is out of phase. If the lowest sound level is heard with the balance control fully to the right, the left speaker is out of phase. Reverse the speaker connections at either the amplifier or the out of phase speaker. THIS TEST WILL NOT WORK IF YOU ARE USING THE AI-1 ADAPTOR WITH NON-COMMON GROUND AMPLIFIERS. CALL YOUR POLK DEALER FOR INSTRUCTIONS IN THIS CASE. A note about this test: The balance control position where the lowest sound level occurs has established True Center Balance for your amplifier. Playing music at this position will give you optimal balance and the best sound stage for your SDAs. True Center for your amplifier may change at different listening levels and some recordings are balanced more to one side than the other but this knowledge will help you get the most from your system.

4. Reconnect the (-) Black wires to your speakers. Return the amplifier to STEREO operation, make certain that your recording is in stereo, and sit in the chair to listen for a few minutes. You should hear some sounds that appear to come from an area outside the two speakers as well as sounds that appear to come from between the speakers. By manipulating the balance control you should be able to move the apparent sound source from far outside the left speaker to far outside the right speaker. If your speakers do not perform as explained above, proceed to the Troubleshooting section and also read the section on SDA Technology.

SPEAKER HOOKUP WIRE:

We recommend that you use #16 gauge wire or larger to connect the speakers to the amplifier. This will ensure that the full power and damping capabilities of your amplifier will be available to the speakers. Heavier gauge wire will give improved performance, especially where long runs are involved.

For the best performance we recommend the use of special speaker cables, particularly those of the low-inductance, transmission line type. Your Polk dealer will have suggestions.

ROOM PLACEMENT:

1. Place both speakers against the same wall facing straight forward. DO NOT ANGLE SPEAKERS INWARD OR OUTWARD. The design of the SDA loudspeakers require that they be parallel to a common wall and to each other.

2. There are several distances to consider in placing your speakers (see Figure 3). They are:
X = Listener distance from speakers
Y = Speaker distance from rear wall
Z = Speaker distance from each other
S = Speaker distance from side wall
* By decreasing distance 'Y' you will increase bass response; by increasing that distance you will experience less bass. Your speakers will generally sound best when placed close to the back wall. Also, the front baffles should be at least 2 inches forward of any obstructing objects, such as cabinets.
* Distance 'Z' should be at least 4 feet. 6 to 8 feet is optimum in most listening rooms. In a 'live' room (lots of hardsurfaces, not too many curtains, cushions, sound absorbing materials) SDAs often sound best placed fairly close together. Experiment!
* Distance 'X' should be greater than or equal to distance 'Z'.

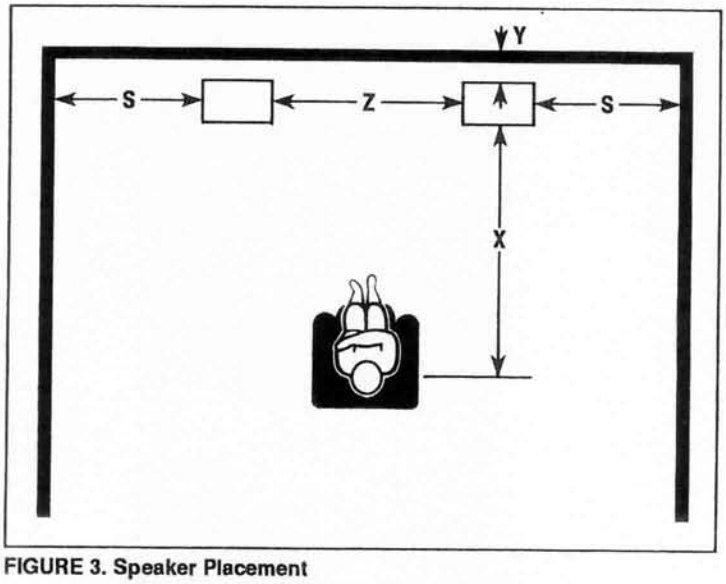

FIGURE 3. Speaker Placement

* Distance 'S' should be AT LEAST 3 feet. Placement closer to sidewalls will interfere with 3-dimensional imaging.

3.Best Listening Area:
The SDA loudspeakers will reproduce a dramatic 3-dimensional soundstage for listeners in nearly every part of the room. However, as the best concert halls also have their best seats, there is also a best listening area for your SDAs. This is the area roughly equidistant from both speakers and about 10 feet in front of them. In this area the SDA speaker offers to the listener an unparalleled, startling listening experience.

Note for CRS + Owners: The SDA-CRS+ has been designed to operate properly when placed on a shelf or on stands further out into the room. Shelf mounting will produce a warmer sound, while placement on stands away from the walls will produce a cleaner sonic image.

The decision on where to place the speakers is a matter of personal preference as well as acoustics. The unique design of the SDAs makes them unusually free of room dependent acoustic effects. However, careful attention to set-up instructions and placement suggestions is essential to the correct functioning of the SDA.

AMPLIFIERS AND SDA LOUDSPEAKERS:
Although the SDAs are highly efficient and compatible with most amplifiers, a few specific things should be observed to assure the best performance from your system.

First, THE AMPLIFIER USED MUST BE OF THE COMMON-GROUND TYPE. Virtually all receivers and amplifiers are constructed in this way with the amplifier chassis serving as the common-ground between channels. If you think that your amplifier may not be common-grounded, call Polk Audio or your local hi-fi dealer to find out for certain. For non-common ground, bridged, or separate mono amplifiers you must use the AI-1 Amplifier Interface available from your Polk dealer.

Second, the SDA loudspeakers are a very "easy" load for amplifiers to drive. This means that amplifiers of moderate power capabilities may offer a much greater dynamic range than you would expect when used with an SDA. The load is nearly a pure resistance in normal operation but varies dynamically with the balance of signals between the two channels. This means that amplifiers that are comfortable driving low impedances and do not have excessive current limiting will be better suited to the SDA, especially at higher listening levels.

LISTENING LEVELS AND AMPLIFIER POWER:
The SDA is a highly efficient system and will easily achieve loud listening levels with moderate amounts of power. Your SDA loudspeaker will handle with ease the output of large amplifiers. Remember that the greatest chance of damage to any speaker occurs when the amplifier, regardless of size, is overdriven. Surprisingly, the possibility of damage is usually greater with small amplifiers than with large ones.

In most cases when audible distortion is heard at high levels it is caused by the overdriven amplifier and not by the speaker. It is absolutely critical to understand that regardless of amplifier size or speaker power rating, when you turn the volume control past the point where distortion becomes audible you are risking damage to both the speaker and amplifier.

All SDAs are equipped with a thermal protective device in the tweeter circuitry to protect the tweeter array against overcurrent situations which may occur when an amplifier malfunctions or is overdriven. When an overload condition is detected in this circuit, the protective device quickly reduces the current flow to a safe level until the condition is removed; the effect on the sound of the speakers is to reduce the output from the tweeters. The device will reset itself within about thirty seconds after the volume level is turned down. Since the device becomes hyper-sensitive after tripping; a thirty second wait will allow the device to return to normal sensitivity.

When this device trips, it is usually an indication that the amplifier is being overdriven. A larger amplifier able to deliver more clean power will enable the speakers to go louder without tripping the thermal protection.

To see how this may happen, consider that the amplifier is a device which allows a controlled amount of power to flow from the AC wall outlet to the speaker. If the volume control is advanced too far, the amp may lose control of the flow and dump much of the power of the AC outlet into your loudspeaker. The power rating of an amplifier is a measure of how much clean power it will safely produce. However, most amplifiers are able to produce distorted power several times greater than their rated power.

SDA, TRUE STEREO TECHNOLOGY: HOW DOES IT WORK?

SDA Technology is a means of reproducing a much larger and more realistic sound stage than can be achieved by conventional speakers. The way that this is accomplished is to make sure that only the original recorded signal reaches the listener's ears. The original recorded signal is entirely contained in the direct sound of the left speaker reaching the left ear and the direct sound of the right speaker reaching the right ear. Normally when a person listens to a conventional pair of stereo speakers sound from each speaker reaches each of the person's ears (figure 4). The extra signals, crossing the listener's head to reach the ear on the opposite side, can be thought of as a dieastoartion which causes the sound field rto be constricted and shallow (figure 5). SDA Technology uses the acoustically inverted dimensional signal to cancel the extra signals without affecting the original recorded signal reaching the listener's ears directly (see Figure 6). The result is that only the

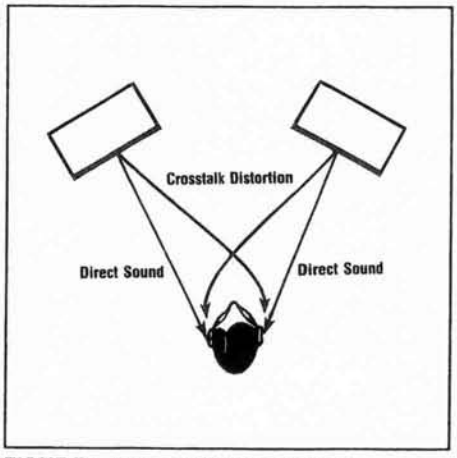

FIGURE 4. Conventional Speakers

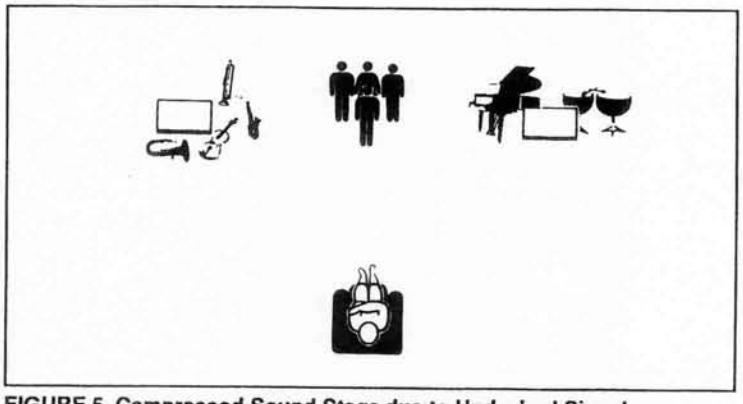

FIGURE 5. Compressed Sound Stage due to Undesired Signals

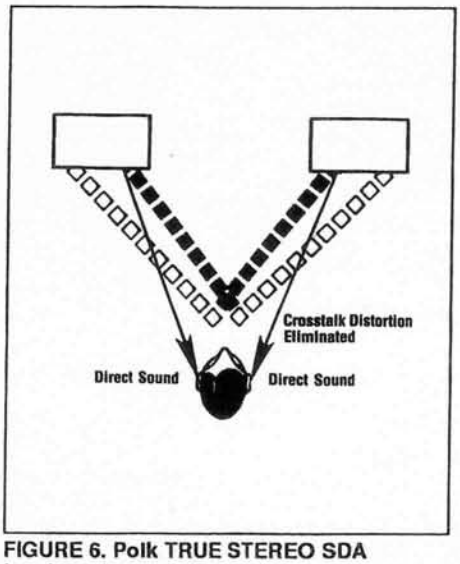

FIGURE 6. Polk TRUE STEREO SDA Loudspeakers

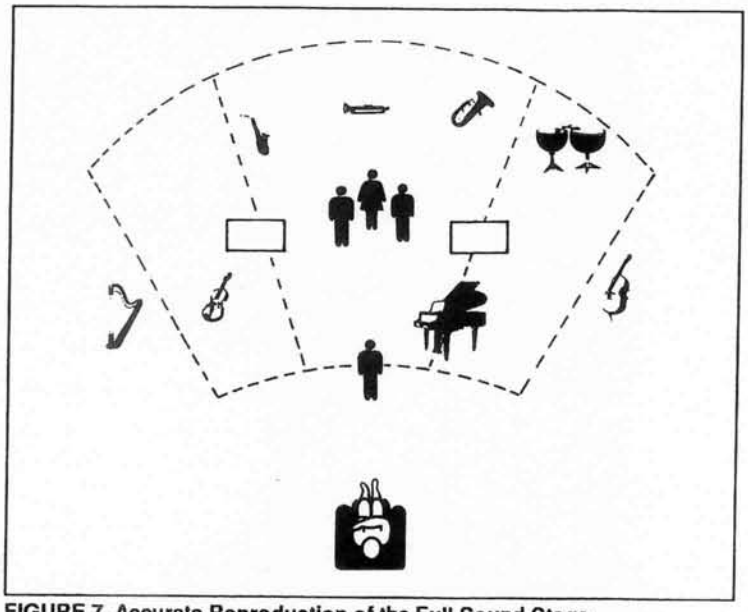

FIGURE 7. Accurate Reproduction of the Full Sound Stage by the SDA Loudspeakers

correct original recorded signal reaches the listener's ears and the full width and depth of the sound stage are accurately reproduced (figure 7). If you are interested in additional technical information contact Polk Audio for a copy of 'Polk's SDA Speakers: Designed in Stereo' by Matthew Polk.

TROUBLE SHOOTING:

Your SDA series loudspeaker is a very unusual system and some understanding of its physical layout will be helpful in determining whether a problem lies with the speaker system or with the associated equipment. Viewed from the front with the grilles removed they will appear as shown in Fig.(7). Note that the components are mirror-imaged in function.

Follow the system check-out procedure described earlier in the manual to determine whether there is a problem specific to the Stereo/Dimensional effect. If so, follow Part II of the trouble- shooting chart. If the problem seems to be generalized to the entire system, use Part I.

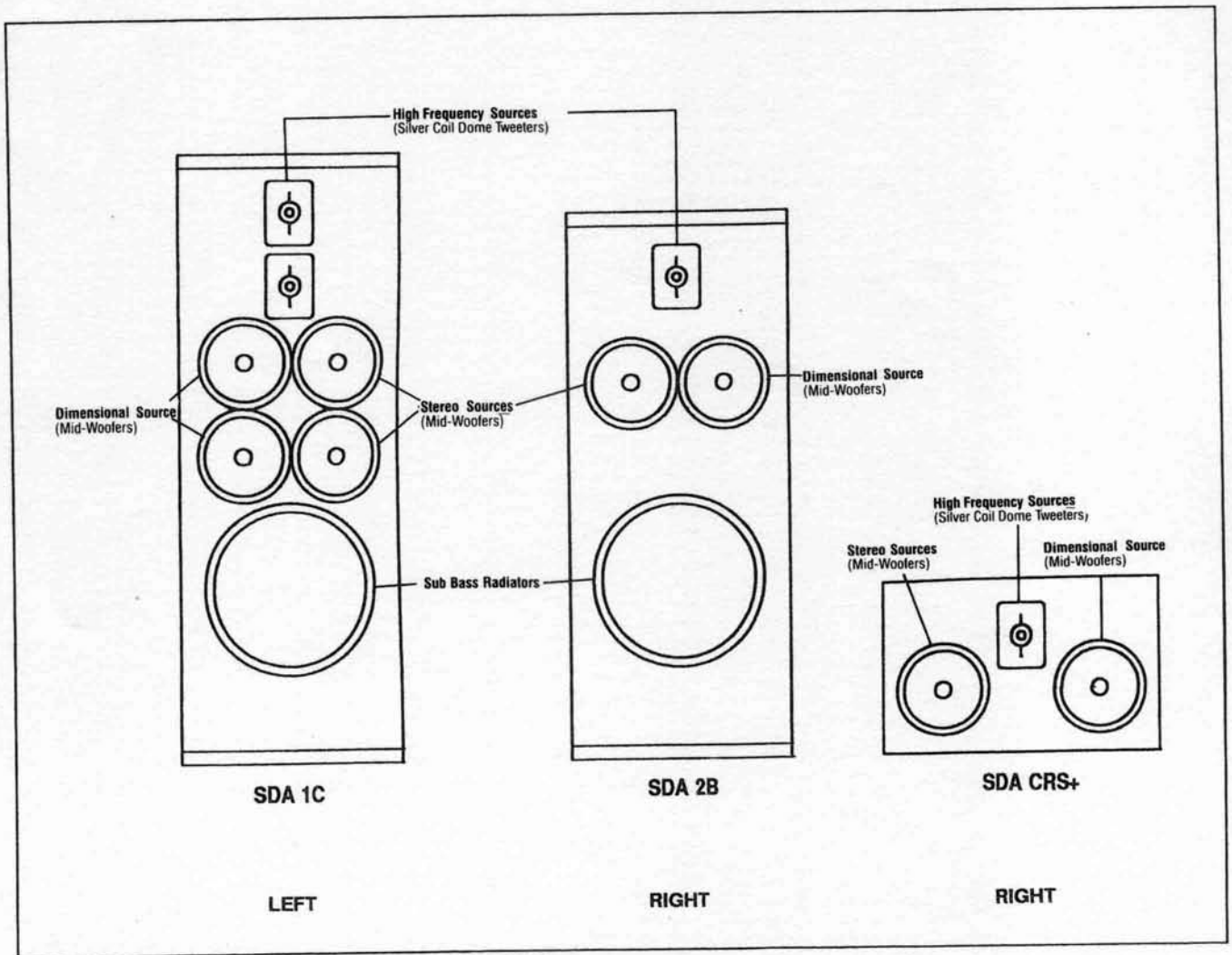

FIGURE 8. The front of the SDA 1C, SDA 2B and SDA CRS+

TROUBLE SHOOTING CHART PART I

Problem	*Solution*
1. No sound from speakers	1a. Check connections to both speakers and all amplifier connections. 1b. Make sure amp is plugged in.
2. No high frequency output	2a. Thermal protective device has not yet reset: turn down amplifier level for thirty seconds.
3. Bottoming of low frequency drivers or excessive cone motion	3a. Turn off loudness contour control. 3b. Check for warped record. 3c. Use subsonic filter on amp or pre-amp. 3d. Increase tracking force or effective-mass of tonearm. 3e. Use sturdier mounting for turntable. 3f. Reduce bass control on amplifier. 3g. Possible overdriven amplifier. Reduce listening level.
4. Unnatural bass emphasis	4a. Turn off loudness contour control. 4b. Place speakers farther from walls or corners. 4c. Reduce bass control on amplifier.
5. Howling occurs at high volumes(acoustic feedback)	5a. Place turntable farther from speakers. 5b. Use sturdier mounting for turntable (see also 4a, b, c).
6. Breakup or distortion on forceful recordings (especially horns, female vocals, piano, etc.)	6a. If this occurs at all listening levels on a record, check the stylus carefully for dirt. 6b. Increase tracking force on record.Tracking force should be set at the maximum recommended for that cartridge. Use several records to check this. 6c. Possible overdriven amplifier (especially with CDs). Reduce listening level. 6d. Make sure speakers are in correct ABSOLUTE PHASE.
7. Distortion at moderate listening levels	7a. Check amplifier connections and all rear panel connections on speakers. Make sure speakers are in correct absolute phase. 7b. Amplifier current limiting protection circuitry may be malfunctioning. Have amplifier checked.

Problem	*Solution*
8. Distortion at high listening levels (see section on 'Listening Levels and Amplifier Power')	8a. Listen at lower levels. 8b. Purchase larger amplifier.
9. Tweeter protective circuitry trips repeatedly	9a. Amplifier too small for listening level. Reduce volume setting. 9b. Thermal protection device is overheated. Turn volume down for thirty seconds, then listen at a lower volume than before. 9c. Have amplifier checked for proper operation.
10. Not enough bass	10a. Make sure speakers are in correct phase. 10b. Move speakers closer to rear wall.

TROUBLESHOOTING CHART PART II

Problem	*Solution*
1. Sound from only one speaker when balance control is turned to one side (When balance control is turned all the way to one side or the other, the image should shift far to one side or the other. However, some sound should still come from both speakers.)	1a. Check interconnect cable for proper connection. 1b. Check to make certain that both speakers are connected in proper phase.
2. Image does not spread outside speakers	2a. Check interconnect cable. 2b. Speakers should face straight forward, NOT angled inward. For best results, listener should be at an equal distance from the two speakers. 2c. Make sure amp is set to stereo and recording is in stereo. 2d. Check phase and integrity of speaker connections. 2e. Make sure speakers are at least 3 feet from side walls.
3. Image is balanced to one side or the other	3a. Check amplifier balance control for center. Repeat True Center Balance test in System Checkout instructions. 3b. Check phase and integrity of speaker connections. 3c. Check program material. 3d. Check speaker placement in room.
4. No center image	4a. Check phase of speaker connection

CRS+
PHYSICAL SPECIFICATIONS:

Dimensions	10 1/8"D X 20"W X 12 3/4"H
Shipping Weight per Cabinet	35 lbs.
Driver Complement	1 X MW6510 Mid L.F. (Stereo) 1 X MW6511 Mid L.F. (Dimensional) 1 X SL2000 H.F. 1 X SW102 Passive Radiator
Nominal Impedance	6 ohms
Tweeter Protection	Semiconductor, thermal, self-resetting
Enclosure Type	Passive Radiator, Left-Right Mirror-Imaged Cabinets
Crossover Type (each cabinet) High Pass	(One per cabinet) 2nd order Gaussian; Resonance and Inductance Compensated; 2.5 KHz
Low Pass -- #1	(Two per cabinet) 2nd order, Impedance Compensated; 125 Hz
Low Pass -- #2	(One per cabinet) Fully complementary sub-bass operation of both drivers below 150 Hz
Dimensional Matrix --	One per system

SDA-2B
PHYSICAL SPECIFICATIONS:

Dimensions Standard Version Studio Version	 11 1/2"D X 16-9/16"W X 39-5/8"H 11 1/2"D X 15-7/8"W X 38-l/2"H
Shipping Weight per Cabinet Standard Version Studio Version	 80 lbs. 65 lbs.
Driver Complement	1 X MW6503 Mid L.F. (Stereo) 1 X MW6511 Mid L.F. (Dimensional) 1 X SL2000 H.F. 1 X SW121 Passive Radiator
Nominal Impedance	6 Ohms
Tweeter Protection	Semiconductor, thermal, self-resetting
Enclosure Type	Passive Radiator, Left-Right Mirror-Imaged Cabinets

Crossover Type (each cabinet)	
High Pass (One per cabinet)	2nd order Gaussian; resonance and inductance compensated; 2 kHz
Low Pass -- #1 (Two per cabinet)	2nd order Butterworth, impedance compensated; 2 kHz
Low Pass -- #2 (One per cabinet)	Fully complementary sub-bass operation of both driverts below 150 Hz
Dimensional Matrix --	One per system

SDA-1C
PHYSICAL SPEICIFICATIONS:

Dimensions	
Standard Version	11-1/2"D X 16-9/16"W X 44"H
Studio Version	11-1/2"D X 15-7/8"W X 43"H
Shipping Weight per Cabinet	
Standard Version	100 lbs.
Studio Version	85 lbs.
Driver Complement	2 X MW6511 Mid L.F. (Stereo) 2 X MW6510 Mid L.F. (Dimensional) 2 X SL2000 H.F. 1 X SW120 Passive Radiator
Nominal Impedance	6 Ohms
Tweeter Protection	Semiconductor, thermal, self-resetting
Enclosure Type	Passive radiator, left-right mirror-imaged cabinets
Crossover Type (each cabinet)	
High-pass (One per cabinet)	2nd order Gaussian, resonance and inductance compensated; 2kHz
Progressive Point Source (One per cabinet)	Sequential first-order low-pass and high-pass resistance coupled filters set at 2kHz and 4kHz
Low-Pass #1 (Two per cabinet)	2nd order Butterworth, impedance compensated; 2kHz
Low-Pass #2 (One per cabinet)	Fully complementary sub-bass operation of all four drivers below 150 Hz
Dimensional Matrix	One per system